Charles®

SOLID POWER

MARINE SOLUTIONS

www.charlesindustries.com

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SOLID POWER is more than a marketing slogan at Charles Industries, it's a corporate philosophy. SOLID POWER is embodied in our strict adherence to manufacturing standards of excellence; our dedication to supplying your electronics with safe, reliable power; our passion for innovation; and our commitment to the industry's best customer service both before and after the sale.

SOLID POWER is who we are, what we do, and what we strive to provide to our customers each and every day.

SOLID POWER

Charles Industries, Ltd. • 5600 Apollo Drive • Rolling Meadows, IL 60008 • (847) 806-6300 • www.charlesindustries.com

HQ BATTERY CHARGERS

ABS listed and certified Marine Battery Chargers that meet USCG requirements for megayacht and workboat fleets around the world.

The HQ Series offers a rugged battery charger and power supply all in one unit. Many government, military, homeland security, megayachts, and commercial marine vessels are required to meet ABS standards on all new construction over 150 gross tons and/or vessels over 90 meters. The HQ Series delivers full compliance for battery chargers. Models feature 120/240VAC input and 12VDC (25-105 amp) or 24VDC (15-65 amp) output. 5-year limited manufacturer's warranty, made in the USA.

Specifications

- Agency approvals: ABS listed and certified, meets USCG (10B) and ABYC (A-31) requirements
- LED indicator pilot lamp
- Quick disconnect on/off switch on front cover
- Separate voltmeter and ammeter
- Internal failure alarm (ready), customer to provide indicator
- Multi-bank (3), multi-stage (bulk, absorption and float) battery charger
- Ability to work as power supply
- Voltage and current limiting ability
- Thermal, over-current, ignition and reverse-polarity protected
- Input and output fusing
- Constructed with heavy-duty, corrosion resistant, UL recognized materials
- Designed to run cool, quite and EMI/RFI interference free
- Temperature compensation - built for optimal performance in a variety of ambient temperatures
- AC input: 120VAC or 240VAC models
- DC output: 12VDC/25-105 amp or 24VDC/15-65 amp
- 50/60Hz for international and U.S. applications
- Drip shield (necessary) included
- ABS Type Approved

12 Volt Models

Amperage	120 VAC · 50/60 Hz	220 VAC · 50/60 Hz	Dimensions	Weight
25	9Q-12255HQ-A	9Q-12255HQI-A	8.125"x9"x4.75"	8 lbs.
35	9Q-12355HQ-A	9Q-12355HQI-A	8.125"x9"x4.75"	8 lbs.
45	9Q-12455HQ-A	9Q-12455HQI-A	13.25"x9"x4.75"	10 lbs.
55	9Q-12555HQ-A	9Q-12555HQI-A	15.25"x9"x4.75"	11 lbs.
65	9Q-12655HQ-A	9Q-12655HQI-A	21.5"x9"x4.75"	16 lbs.
85	9Q-12855HQ-A	9Q-12855HQI-A	21.5"x9"x4.75"	17 lbs.
105	9Q-121055HQ-A	9Q-121055HQI-A	21.5"x9"x4.75"	17 lbs.

24 Volt Models

Amperage	120 VAC · 50/60 Hz	220 VAC · 50/60 Hz	Dimensions	Weight
15	9Q-24155HQ-A	—	8.125"x9"x3.75"	8 lbs.
25	9Q-24255HQ-A	9Q-24255HQI-A	13.25"x9"x3.75"	10 lbs.
35	9Q-24355HQ-A	9Q-24355HQI-A	15.25"x9"x3.75"	11 lbs.
45	9Q-24455HQ-A	9Q-24455HQI-A	15.25"x9"x3.75"	11 lbs.
55	9Q-24555HQ-A	9Q-24555HQI-A	21.5"x9"x4.75"	17 lbs.
65	9Q-24655HQ-A	9Q-24655HQI-A	21.5"x9"x4.75"	17 lbs.

SALES SUPPORT

(Monday - Friday, 8:00 AM - 5:00 PM CST)

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TECHNICAL SUPPORT

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Web: www.charlesindustries.com
(includes Owner's Manual archive)

5000 SP BATTERY CHARGERS

5000 SP Series chargers feature a battery type selector switch, allowing you to charge Lead Acid, Gel or AGM batteries. They are tested by Marine UL for safety and durability against impact, vibration, temperature and shock. 3-stage charging with temperature compensation (30 Amp and greater models) delivers the greatest charge when the battery is most able to accept it, prevents over-charging and extends battery life. Up to 3 battery banks can be simultaneously restored. These units also act as a power supply providing constant voltage to DC components such as bilge pumps or DC lighting. A convenient design features an easy-to-read DC ammeter, access to terminal connections and fuses and exterior slots for easy mounting. Safety features include ignition and reverse-polarity protection. These units are designed with corrosion-resistant components, a heavy-duty enclosure and heat sink for durability in the marine environment. Units run cool and quiet, without generating significant RFI or EMI interference. All units are Marine UL listed and are designed for low emissions. Dripshield included. 5-year limited manufacturer's warranty, made in the USA.

Specifications

Battery Types:	Lead Acid, Gel or AGM
Charge Voltage Bulk:	14.5V / 14.2V / 14.2V
Charge Voltage Float:	13.4V / 13.4V / 13.35V
DC Output Voltage:	12V or 24V
AC Input Voltage:	95-140VAC or 200-240VAC
Frequency:	50Hz or 60Hz
Temperature Range:	-20ºC to 55ºC
Safety Features:	Thermal, over current, reverse polarity and ignition protected
Housing:	Anodized Aluminum
Dimensions (12V):	10-20 amp: 8.125"x9.625"x3.75", 30 amp: 10.5"x9.625"x3.75", 40 amp: 13.25"x9.625"x3.75", 50-60 amp: 15.25"x9.625"x3.75", 80-100 amp: 21.5"x9.625"x3.825" (see website for 24V model dimensions)

21-104589-0	Replacement Dripshield for 10 to 40 amp 5000 SP Series Battery Chargers
93-TEMPPROBE-A	Temperature Probe for 30, 80 & 100 amp 12 volt models and 50 & 100 amp 24 volt models

12 Volt Models

Amperage	120 VAC · 50/60 Hz	220 VAC · 50/60 Hz
10	93-12105SP-A	N/A
15	93-12155SP-A	N/A
20	93-12205SP-A	9C-12205SPI-A
30	93-12305SP-A	9C-12305SPI-A
40	93-12405SP-A	9C-12405SPI-A
50	93-12505SP-A	9C-12505SPI-A
60	93-12605SP-A	9C-12605SPI-A
80	93-12805SP-A	9C-12805SPI-A
100	93-121005SP-A	9C-121005SPI-A

24 Volt Models

Amperage	120 VAC · 50/60 Hz	220 VAC · 50/60 Hz
10	93-24105SP-A	N/A
20	93-24205SP-A	9C-24205SPI-A
30	93-24305SP-A	9C-24305SPI-A
40	93-24405SP-A	9C-24405SPI-A
50	93-24505SP-A	9C-24505SPI-A
60	93-24605SP-A	9C-24605SPI-A

2000 SP BATTERY CHARGERS

An excellent choice for value-priced, high-performance DC charging, the 2000 SP Series units include a battery type selector switch allowing you to charge Lead Acid, Gel or AGM batteries. 3-stage charging delivers the greatest charge when the battery is most able to accept it, preventing overcharging and extending battery life. Units restore up to 3 banks simultaneously. Other features include the ability to act as a power supply, ignition and reverse-polarity protected, easy-to-read DC ammeter, corrosion-resistant components and housing, and a heavy-duty heat sink design. Exterior slots allow for easy mounting. 2-year limited manufacturer's warranty, made in the USA.

Specifications

Battery Types:	Lead Acid, Gel or AGM
Charge Voltage Bulk:	14.5V / 14.2V / 14.2V
Charge Voltage Float:	13.4V / 13.4V / 13.35V
DC Output Voltage:	12V
AC Input Voltage:	95-140VAC
Frequency:	50Hz or 60Hz
Temperature Range:	-20ºC to 55ºC
Safety Features:	Thermal, over current, reverse polarity and ignition protected
Housing:	Anodized Aluminum
Dimensions:	10-30 amp: 8.125"x9.625"x3.75", 40 amp: 10.5"x9.625"x3.75", 50 amp: 13.25"x9.625"x3.75"

12 Volt Models

Amperage	120 VAC · 50/60 Hz
10	93-12102SP-A
15	93-12152SP-A
20	93-12202SP-A
30	93-12302SP-A
40	93-12402SP-A
50	93-12502SP-A

9000 SP BATTERY CHARGERS

These marine UL listed chargers use self-regulating ferroresonant transformers devoid of any complicated switching circuits to charge up to three battery banks simultaneously. Built with rugged stainless steel enclosures and UL recognized, high-quality components to withstand the marine environment. Accurately charge lead-acid batteries only. Features include an easy-to-read ammeter to indicate rate of charge and ignition-protected components for safety. 12, 24 or 32VDC. Dripshield included. 5-year limited manufacturer's warranty, made in the USA.

Specifications

Battery Types:	Lead Acid
Battery Banks:	15 Amp = 2, All Others = 3
Charge Voltage:	Single stage 13.8V finish on 12VDC, 27.6V finish on 24VDC
DC Output Voltage:	12V, 24V or 32V
AC Input Voltage:	95-140VAC
Frequency:	60Hz
Temperature Range:	-25ºC to 55ºC
Safety Features:	Thermal, over current, reverse polarity and ignition protected
Housing:	Stainless Steel

12 Volt Models

Amperage	120 VAC · 60 Hz
15	CI1215A
20	CI1220A
30	CI1230A
40	CI1240A

24 Volt Models

Amperage	120 VAC · 60 Hz
20	CI2420A
30	CI2430A
40	CI2440A

32 Volt Models

Amperage	120 VAC · 60 Hz
30	CI3230A
40	CI3240A

MARINE C UL US LISTED

Dimensions: 12V 15-20 amp: 6.25"x7.5"x9.5"; 12V 30-40 amp, 24V 20-30 amp: 8.75"x9"x11.5"; 24V 40 amp, 32V 30-40 amp: 10.25"x11.5"x13"

10 REASONS TO BUY A CHARLES C-CHARGER® BATTERY CHARGER

1. Fully automatic recharging
Batteries must optimally perform in the marine environment, yet they are susceptible to a vast number of ills, including misuse. If used incorrectly, they will begin to degenerate and battery cells may be lost. Charles C-Chargers automatically recharge batteries to 100% with accurate current and voltage regulation. In larger units, (30 amp - 100 amp models) automatic temperature compensation guarantees fast, safe and efficient charging.

2. Ability to simultaneously recharge and act as a power supply
C-Chargers function as both a battery charger and a power supply that automatically boosts the 12/24V circuit to full capacity when input voltage is low. Thus, DC loads such as lights or automatic bilge pumps can run off of the battery charger if necessary.

3. Designed for safety
C-Chargers feature thermal, over-current, reverse polarity and ignition protection. Units 30 Amps and above have built-in temperature compensation. These safety features safeguard your power systems and prevent expensive damage to onboard equipment.

4. Built to withstand harsh marine environments
All Charles C-Chargers feature UL recognized, corrosion-resistant components and housings. All PC boards are conformal coated to stabilize hydrolytes and withstand the marine environment.

5. One charger for any battery type
Charles' new 5000 SP and 2000 SP Battery Chargers feature a battery type selector switch. This feature allows the boater to set the charger for either lead-acid, gel or AGM batteries. With Charles C-Chargers, you will not need to continuously replace batteries. C-Chargers are designed to accurately charge the batteries, neither under-charging nor over-charging, thus prolonging battery life.

6. Marine UL Listed
Charles 5000 SP Series High-Frequency and 9000 Series Ferroresonant Battery Chargers are Marine UL Listed. These chargers have passed Underwriters Laboratories' stringent tests including shock, vibration, temperature and corrosion. Marine UL auditors randomly conduct inspections of our manufacturing processes to ensure that Charles products continue to be built to marine UL standards. This continuous testing and inspection ensures that you are receiving the best quality product.

7. Low emissions
All models are designed for low emissions to prevent electrical interference. Thus, the chargers will not significantly interfere with onboard equipment.

8. Made in the USA
Charles is a vertically integrated company, manufacturing components and finished goods in the midwestern United States. The employees of our Casey, Illinois manufacturing plant take great pride in the quality of their workmanship.

9. Industry's best warranties
Charles' 5000 SP series and 9000 series battery chargers feature a 5-year warranty that sets the standard for marine battery chargers.

10. Designed to improve battery longevity and save you money
C-Chargers are designed to accurately charge batteries, neither over nor under charging them, to keep battery cells healthy. All electronic chargers feature isolated outputs, eliminating the need for a battery isolator and protecting one battery from discharging into another.

GENERAL BATTERY CHARGER INFORMATION

Sizing a Battery Charger

The size of the battery charger depends on the amp-hours of the batteries and the loads the charger must supply. The loads must also include the DC loads for which the charger must provide when in power supply mode. A simple rule of thumb when sizing your charger:

1. Total the number of amp-hours in the battery bank. (Group 24, 27 & 31 batteries are @100-120 amp-hours)

2. Most battery companies recommend that the batteries be discharged no more than 50%. Thus, divide the number of amp-hours by 50%.

3. Decide how much time, in number of hours, you want the recovery of the batteries to take. Divide 50% of the total amp-hours by the number of recovery hours.

4. The final number you are left with is the amperage of the battery charger needed to bring your battery bank to full charge in the desired time.

EXAMPLE: A boater has a battery bank of four Group 27 batteries and would like to recharge in 8 hours.

- 4 Batteries x 120 amp-hours each = 480
- 50% of 480 = 240
- Divided by 8 hours = 30
- Battery charger size should be ≥ 30 amps

Installation Information: wire size, torque, distance and connection to batteries

Charles recommends that you consult ABYC (American Boat & Yacht Council) standards for information regarding the installation and use of onboard, marine battery chargers. Charles torque recommendations are included within all owner's manuals. Wire size depends on the distance from the batteries to the charger.

Charles recommends consulting ABYC standards for direction on the use and installation of batteries and chargers. Please visit www.abycinc.org for more information.

Charging Multiple Battery Banks (outputs):

Charles C-Chargers include isolation at each output. 2000 SP, 5000 SP, 9000 & HQ chargers will look for the battery that is the most depleted and direct power into that unit first. When that battery's power is level with the others, the charger will share power with all of the batteries in the bank. The IMC Charger uses a round-robin approach to charging. All batteries will charge in sequence, with additional time give to batteries with lower power levels. Charles C-Chargers are constructed in a such a way that each output can handle the full current rating.

Should I leave my charger turned on at all times?

If you are using a C-Charger you should leave the charger on at all times. The output voltage of the electronic C-Chargers (2000 SP, 5000 SP, HQ & IMC series chargers) will move to a "float" stage, or maintenance stage, of charge. This provides a minimal amount of voltage to the battery(s) that creates a very low level of heat while maintaining the "ampacity" of the battery(s). Ferroresonant, single stage chargers will reach a peak voltage of 13.8V at 10% of the full rated amperage of the charger; this is the low end of the unit's operating curve considered the maintenance phase. Do not forget that batteries are in constant use, even for minimal loads such as automatic bilge pumps and DC lighting. If a small amount of charge is not continually provided to the batteries while they are supplying power to these items, they may deeply discharge having an adverse effect on the batteries.

How long does battery recharge take?

There are many factors that can either shorten or lengthen the time it takes to recharge batteries, including condition of the batteries, battery temperature, depth of discharge, loads on the batteries, etc. The average recommended time for recharge is 8 hours if the C-Charger is sized properly. (See ABYC standards for load calculation and sizing info.) This time can be adjusted based on user preference, understanding of battery upkeep, the use of temperature compensation, charging profiles and nominal loads which can enhance or restrict the performance of the charger.

INDUSTRIAL BATTERY CHARGERS

Please see these additional battery charger models on the Industrial Solutions flipside of this catalog:

INcharger Series

Page i3

EB & EP Series

Pages i3-i4

AA Series

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AE Series

Page i6

CI Series

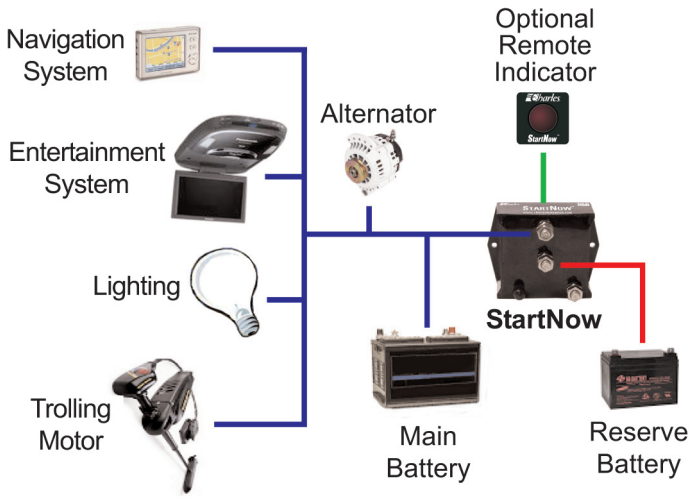
Page i7

STARTNOW™

A great day of boating is a complete success when your engine starts to take you home! There is no worse end to a boating trip than discovering a discharged battery when you are ready to call it a day. With the new StartNow from Charles Marine, you never have to worry about facing this unpleasant experience.

The StartNow microprocessor allows the main battery to drain without draining the reserve battery. StartNow automatically detects if the main battery voltage is too low and activates the reserve battery to start your engine.

Recharging is automatic from an alternator or battery charger and the microprocessor guarantees the battery will never overcharge and always be ready. 1-year limited manufacturer's warranty, made in the USA.



Specifications

Weight:	1 lb.
Dimensions:	3"H x 4"W x 2.5"D

Part Number	Description
93-STARTNOW-A	StartNow
93-STARTNWRMT-A	Optional Remote Dash Indicator

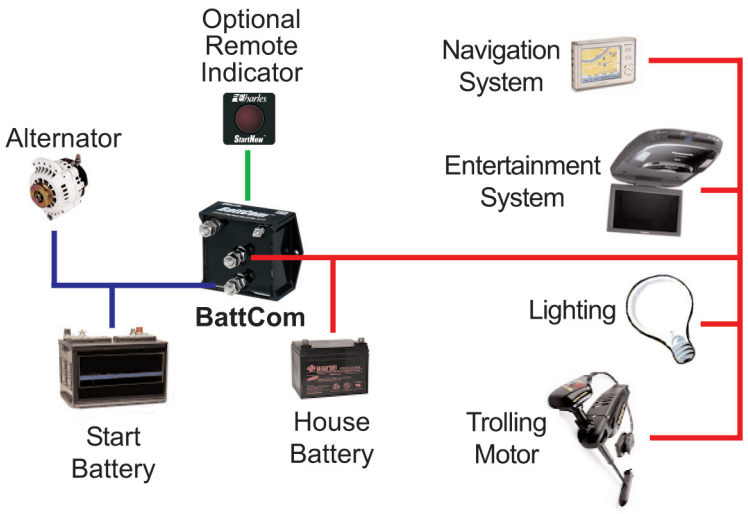
BATTCOM™

The BattCom™ is a high-tech battery combiner that automatically allows the charging of two batteries from a single alternator.

Using advanced technology and complex logic, the BattCom monitors the alternator of the boat. Once an operational alternator is detected, both batteries are automatically combined. When the alternator is turned off, the batteries are once again isolated to prevent power draining from the other battery.

The BattCom is ideal for multiple battery systems and as an automatic battery switch replacement.

Designed for rugged environments, the compact BattCom incorporates 280 amp heavy duty relay contacts and is 100% sealed and waterproof. Corrosion resistant stainless steel studs and an impact resistant ABS case make this battery combiner a must for any serious boater. 1-year limited manufacturer's warranty, made in the USA.



Specifications

Weight:	1 lb.
Dimensions:	3"H x 4"W x 2.5"D

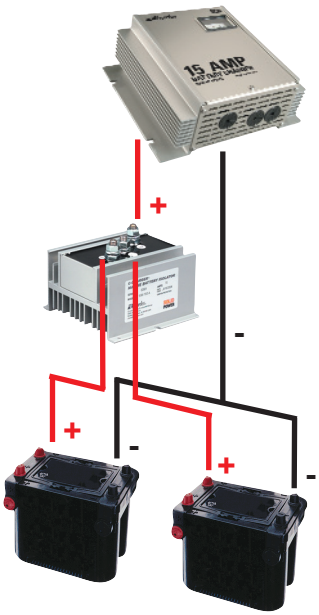
Part Number	Description
93-BATTCOM-A	BattCom - 12VDC
93-STARTNWRMT-A	Optional Remote Dash Indicator

BATTERY ISOLATORS

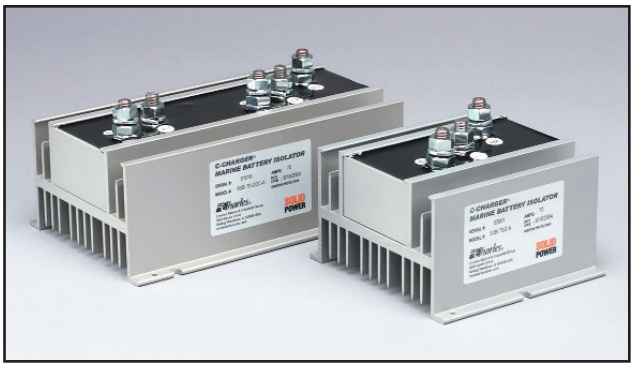
All Charles Battery Isolators are ignition protected. They feature a heat chamber design, protective boots on heavy-duty 5/16" battery and alternator studs, corrosion-resistant casings, are compact and easy to install. Either leg of the Charles Battery Isolator handles the entire alternator output amperage rather than a portion of the rated load. 1-year limited warranty, made in the USA.

Using a Battery Isolator

When charging multiple battery banks, Charles suggests connecting a battery isolator between the charger and the batteries. Battery isolators isolate charge current and stop it from recirculating, thus preventing one battery from discharging into a lesser charged battery. When properly installed within the system, the alternator remains connected to the batteries at all times, eliminating the possibility of damage to the diodes. Charles Battery Isolators are built to be robust, with either leg of the isolator handling the entire alternator output amperage rather than a portion of the rated load. Please note that by inserting a battery isolator into the system, a voltage drop of approximately 0.7 to 1.5 DC, depending on the charge current, will occur.



12V DC Charging System including (from top to bottom): battery charger, battery isolator and battery bank.



Product No.	Amps	Alternators	Battery Banks	Dimensions	Weight
93-BI70/1-A	70	1	1	4.5"x4.875"x3.625"	2 lbs.
93-BI70/2-A	70	1	2	4.5"x4.875"x3.625"	2 lbs.
93-BI70/3-A	70	1	3	4.5"x4.875"x3.625"	2 lbs.
93-BI702/3-A	70	2	3	7.5"x4.875"x3.625"	2 lbs.
93-BI90/2-A	90	1	2	6.5"x4.875"x3.625"	3.5 lbs.
93-BI130/2-A	130	1	2	6.5"x4.875"x3.625"	4 lbs.
93-BI160/2-A	160	1	2	7.5"x4.875"x3.625"	4.6 lbs.
93-BI160/3-A	160	1	3	9.75"x4.875"x3.625"	5.5 lbs.
93-BI190/2-A	190	1	2	9.75"x4.875"x3.625"	4.7 lbs.
93-BI190/3-A	190	1	3	10.5"x4.875"x3.625"	5.5 lbs.
93-BI250/2-A	250	1	2	10.5"x4.875"x4.125"	5.8 lbs.

BATTERY SELECTOR SWITCHES

Charles Battery Selector Switches allow boaters to choose between any combination of two batteries. The switch with alternator disconnect is for use when the batteries are shut off but the engine is still running. The alternator disconnect eliminates possible damage to the alternator, a valuable assurance that the alternator is protected. All Charles Battery Selector Switches are ignition protected, Marine UL Listed and meet US Coast Guard and ABYC standards. All switches are manufactured with heavy-duty contacts for optimal, reliable performance. 2-year limited manufacturer's warranty.

Features

- White polyethylene color with black knob
- Heavy-duty contacts ensure optimal performance
- Lightweight, compact and easy to install
- Screw caps provide clean installation
- Designed with corrosion-resistant materials for years of trouble-free use in marine environments
- Marine UL Listed

MARINE C UL US LISTED

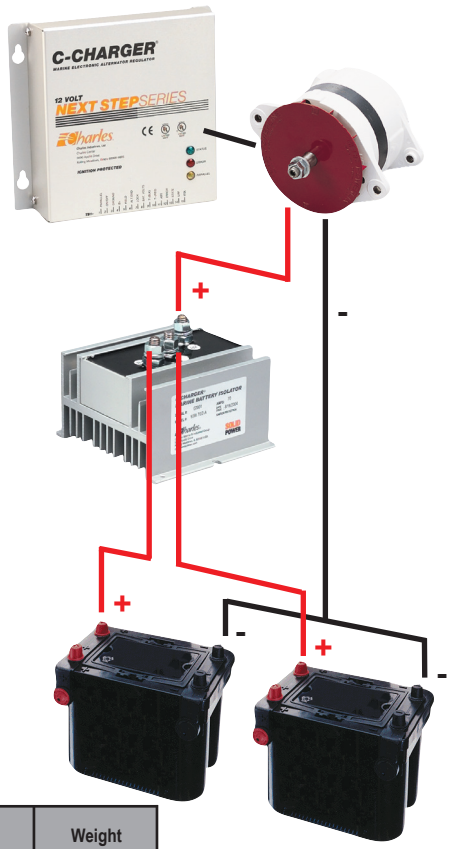
Product No.	Description	Continuous Amps	Intermittent Amps	Dimensions	Weight
93-BS002AD-A	Four position (2 battery) switch with Alternator Disconnect	230	345	5.5" dia., 2.6" deep	2 lbs.
93-BS002-A	Four position (2 battery) switch without Alternator Disconnect	230	345	5.5" dia., 2.6" deep	2 lbs.
93-BS001-A	On/Off Switch	230	345	5.5" dia., 2.6" deep	2 lbs.

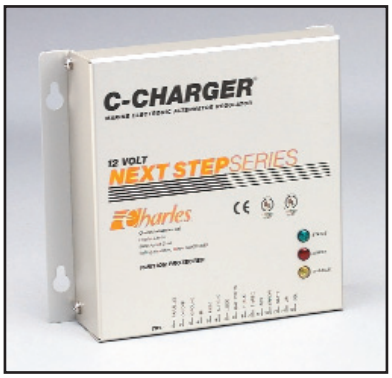
MULTI-STAGE REGULATORS

Charles Multi-Stage Regulators are designed to control the power of the alternator output and maintain the proper battery charging voltage regardless of the engine speed. The charge effect of the alternator depends solely on the electronic three-stage regulator. These units have been designed for use with a wide variety of type-P alternators. 2-year limited manufacturer's warranty, made in the USA.

Features

- Utilizes microprocessor-controlled technology to regulate the alternator output
- Multi-stage charging: 1st current is limited by the alternator, 2nd absorption stage current begins to fall off, 3rd float or maintenance stage. Charging profile is adjustable
- Ignition protected
- Smart overload protection
- Temperature compensation
- LED charge state indicators
- Corrosion-resistant components
- Marine UL Listed





MARINE C UL US LISTED

12V Alternator/Regulator System including (from top to bottom): multi-stage regulator, alternator, battery isolator and battery bank.

Product No.	Description	Dimensions	Weight
93-12PREG-C	12V Multi-Stage Regulator	7.25"x7.5"x2.75"	1.5 lbs.
93-24PREG-B	24V Multi-Stage Regulator	7.25"x7.5"x2.75"	1.5 lbs.

CONTINUOUS DUTY POWER SUPPLIES

Onboard equipment such as single side-band radios, radar rectifiers, halogen and other lighting systems require a constant DC voltage to operate, yet the source does not have to be batteries. Power supplies may be used to run this equipment. They provide a constant 14.4 volts DC and are lightweight, compact, clean, quiet and easy to install. They are able to accept variances in frequency, 45 to 65 Hz, and variances in AC input (120 VAC units: 90 to 135 VAC, 220 VAC units: 180 to 270 VAC) without degrading output. 1-year limited manufacturer's warranty, made in the USA.

Technical Information

- Constructed with a heavy-duty heat sink, anodized aluminum enclosure and corrosion-resistant components for years of trouble free use in the marine environment
- Provides a constant 14.4 volts DC
- Compact, lightweight

Product No.	AC Input Volts	DC Output Volts	Amps	Dimensions	Weight
93-PS1230-A	120	13.65	30	3.7"x9.5"x10.5"	9 lbs.
93-PS1240-A	120	13.65	40	3.7"x9.5"x13.25"	10 lbs.
93-PS1260-A	120	13.65	60	3.7"x9.5"x15.25"	12 lbs.
93-PS1280-A	120	13.65	80	3.7"x9.5"x21.5"	17 lbs.
93-PS2430-A	120	25.5	30	3.7"x9.5"x15.25"	10 lbs.
93-PS2460-A	120	25.5	60	3.7"x9.5"x21.5"	17 lbs.
9C-PS2430-A	220	25.5	30	3.7"x9.5"x15.25"	10 lbs.

C-POWER® SURGE SUPPRESSORS

Charles has designed surge protection devices specifically for onboard marine use. These products protect valuable AC and DC systems from power surges and spikes. An EMI suppressor unit is also available to protect against DC transients created by trim tab pumps. 2-year limited manufacturer's warranty, made in the USA.

Features
- Utilize Metal Oxide Varistor (MOV) technology
- Low impedance construction requires little energy to function
- Thermal and short circuit fusing for safety
- Corrosion-resistant, aluminum housing
- Solid-state diagnostics
- Ignition protected

EMI Suppressor
In some cases, the hydraulic solenoid controlled pump utilized in trim tabs can create DC transients. To protect equipment from these transients, Charles has designed the EMI Suppressor. This cost-competitive, compact unit stops transients in their tracks before they can affect onboard equipment.

Special AC Unit Features
- All mode protection
- Suppression of surge current up to 90,000 amps

Special DC Unit Features
- Bi-directional
- 5 nanosecond response time

	AC Units		DC Units		EMI
Product No.	**93-SS30-A**	**93-SS50/100-A**	**93-SS12-A**	**93-SS24-A**	**93-SPRSR-A**
Amperage	30 amps	50/100 amps	—	—	—
VAC/VDC	120 VAC	120/240 VAC	12 VDC	24 VDC	12 or 24 VDC
Dimensions	7.5"x9"x5.25"	7.5"x9"x5.25"	7.5"x9"x5.25"	7.5"x9"x5.25"	6.75"x5"x2.38"
Weight	3.55 lbs.	3.55 lbs.	3.55 lbs.	3.55 lbs.	2.5 lbs.

A LOOK AT CHARLES' CASEY, IL MANUFACTURING CENTER

When you see the "Made in the USA" stamp on a Charles Industries' battery charger, isolation transformer, cord set or any other product, take a moment to consider exactly what that means. For the city of Casey, Illinois, that means jobs for US workers. It's a testament to the pride and dedication of those workers as they strive to provide you with the highest quality, most reliable and safest marine products available anywhere.

Day in and day out at our Marine Products Manufacturing Center in Casey, our experienced workforce puts into practice our commitment to quality. More than 90% of the facility's employees have 5 or more years experience at Charles. Our employees are some of the most knowledgeable, talented, and dedicated workers in the industry, and their manufacturing experience translates into superiorly made AC and DC electrical equipment that is both rugged and reliable.

MADE IN THE USA

Our Casey facility, along with Charles three other US manufacturing centers, is certified to ISO 9001:2008 international quality management system standards. Charles employs environmentally responsible manufacturing methods and gives back to the communities it is a part of through educational programs and endowments. Charles Marine Group is also proud to support charities such as the Shake-A-Leg Sailing Program for disabled and disadvantage participants, and the Judd Goldman Adaptive Sailing Foundation.

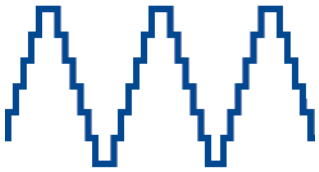
DC-to-AC POWER INVERTERS

Charles Power Inverters convert 12 and 24 volt DC battery power into 120/240 60Hz AC power that can be used to operate onboard equipment and appliances. Now, regardless of the size of the vessel, it is possible to run a notebook computer, microwave, blender, television or other desired equipment. Inverters can also be a viable alternative to turning on a generator. They produce less noise and no fumes, and require less power to run.

True Sinewave vs. Quasi/Modified Sinewave: which inverter is right for your application?
Inverters utilize two types of technology, true sinewave or quasi/modified sinewave. Each has its pros and cons; whether one is better than the other depends on the application. If the unit is used to start equipment that demands a strong surge when turned on, to start up a motor for example (refrigerators, dishwashers, TVs, etc.), a quasi-sinewave inverter is a better choice. If the unit is required to power laptops, radar or items that need very clean power (items with visible screens for example), a true sinewave inverter is ideal. In addition, there are differences among the quality of quasi-sinewave inverters. Modified waves look like steps moving up and then down the wave. The larger the number of steps, the cleaner the power. Charles Quasi/Modified Sinewave Series Inverters make more than 19,000 steps to complete a single sinewave, providing very clean quasi-sinewave power.

True Sinewaveform

Recommended for computers, radar and other equipment with visible screens.



Quasi/Modified Sinewave

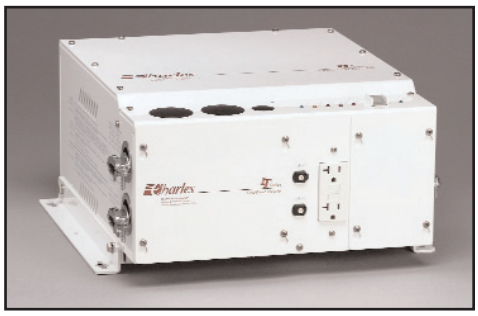
Recommended for motor-driven and high-surge startup equipment.

Effect of using an inverter on batteries
Although earlier inverter technologies used up battery power quickly, new high-frequency inverters are much more efficient. Charles inverters utilize cutting-edge technology that does not waste energy. Household appliances and onboard lights manufactured in recent years are more economical than their 12 or 24 DC volt equivalents. What does that mean to you? Batteries will last longer. Charles inverters are equipped with a specialized circuit that maintains a high output on partial loads and offers a "sleep cycle" mode, using up little power from the batteries while still supplying AC power. This mode will continue to operate low wattage equipment such as VCRs, radios and clocks.

Inverters as an efficient alternative to generators
Generators are noisy, costly and consume expensive fuel. Inverters are quiet and do not produce the exhaust fumes as do generators. They do not consume gas or diesel fuel and can provide up to 4.5 kilowatts of power. Inverters supply power sparingly, only when needed; generators must run continuously. The bottom line: increased fuel economy, fewer hours running the engine, no fumes and hours of quiet onboard power.

How many hours of power will the batteries supply?
Batteries serve as an energy source for 12 or 24 volt equipment as well as the DC power of the inverter. The larger the battery, measured in number of amp-hours, the longer it will last. One must also factor in the loads on the battery to accurately calculate both battery power required and the number of hours the battery will supply that power. Boats normally have DC loads such as lights, pumps, etc. as well as AC loads such as daily appliances, navigation equipment, etc. Please consult the ABYC standards for further information about load calculation.

True Sinewave Inverter



True Sinewave Inverter/Charger

Quasi/Modified Sinewave Inverter

Five reasons to choose Charles' "Solid Power" DC-to-AC Power Inverters

1. Built to last
Features include corrosion-resistant enclosures, conformal coated PC boards, and heavy-duty transformers.

2. Safety and testing
Many units are UL Listed, all units are thoroughly tested prior to shipment. All units feature overload, short-circuit, reverse polarity, over temperature, and under-voltage protection.

3. Easy to install and use
Enclosures provide the flexibility to mount in a variety of positions.

4. Power efficiency
Charles inverters are built to provide optimal AC power when it is needed. A "sleep cycle" mode provides minimal power without draining energy out of the batteries.

5. Suitable for any electrical system
Charles inverters can be installed on any vessel with available battery power. To estimate inverter needs, see page m12.

POWER INVERTER / BATTERY CHARGER COMBO

Charles inverter/battery charger combinations save space by sharing electronics and transformers. While connected to the generator or shore-power, the inverter/ chargers recharge the batteries quickly and efficiently. Status LEDs indicate the batteries' state of charge. The unit automatically controls the charger or inverter functions. While shore power is connected, the battery charger is turned on. When shore power is disconnected, the unit automatically switches to the inverter mode, supplying the electrical system with AC power.

POWER INVERTER SPECIFICATIONS CHART

	True Sinewave						Quasi/Modified Sinewave	
Model	93-ACP1210	93-ACP1215	93-ACP1220	93-ACP1221C	93-ACP1232	93-ACP1232C	93-ACP1226	93-ACP1236
Function	DC-to-AC power inverter—supplies AC power to electronics, appliances and other equipment from user-provided batteries							
Output Wave Form	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	QUASI-SINE	QUASI-SINE
Technology	High Frequency	High Frequency	Line Frequency	Line Frequency	Line Frequency	Line Frequency	Line Frequency	Line Frequency
Low Voltage Shut Off	10.5 VDC	10.5 VDC	10.5 VDC	8.0 VDC	10.5 VDC	10.5 VDC	10.5 VDC	10.5 VDC
High Voltage Shut Off	15 VDC	15 VDC	16.6 VDC	17 VDC	16.6 VDC	16.6 VDC	16 VDC	16 VDC
Load Sensor Activated	10+ Watt Load	10+ Watt Load	5+ Watt Load	Selectable	5+ Watt Load	Selectable	5+ Watt Load	5+ Watt Load
DC Input Voltage	10.5-15 VDC	10.5-15 VDC	10.5-16.6 VDC	10.5-17 VDC	10.5-17 VDC	10.5-16.6 VDC	10.5-16 VDC	10.5-16 VDC
AC Output Voltage	120V±3%	120V±3%	120V±5%	120V±5%	120V±5%	120V±5%	120V±5%	120V±5%
Surge AC Amps (3 seconds)	16	16.7	25.6	53.3	43.7	53.3	65	80
Continuous Wattage	1000	1500	2000	2100	3200	3200	2600	3600
Frequency	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz
Stand-by/ Sleep Mode	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Weight	15.1 lbs.	15.5 lbs.	48 lbs.	66 lbs.	70 lbs.	66 lbs.	74 lbs.	88 lbs.
Dimensions	4.1"x10.8"x15.4"	4.1"x10.8"x15.4"	4.1"x10.8"x15.4"	8.3"x18.5"x13.7"	4.1"x10.8"x15.4"	8.3"x18.5"x13.7"	8.4"x17.5"x14"	8.4"x17.5"x14"
LED Indicators	Low Battery Warning & Shutdown, Over-Temp, Overload, Inverter On/Off							
Protection Features	Overload, Short Circuit, Reverse Polarity, Over Temperature, Over Load, Over/Under Voltage							
Warranty	2-Years	2-Years	2-Years	2-Years	2-Years	2-Years	2-Years	2-Years
UL, cUL Listed	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Inverter/Charger Option	N/A	N/A	N/A	Inverter/Charger Only (100 Amp)	N/A	Inverter/Charger Only (100 Amp)	93-ACP1226C 120 Amp Charger	93-ACP1236C 120 Amp Charger
Notes	Part numbers in orange are inverter/charger combination units. Remote controls available. Units that are not UL or cUL Listed are built to meet UL, cUL standards. Please note that other wattages—as well as 220VAC, 50 Hz models—are available. Please call for further details.							

INVERTER SIZING GUIDE

APPLIANCE	REQ. WATTS	APPLIANCE	REQ. WATTS
Lamp	150	Dehumidifier	1000-1500
Stereo System	200	Ice Maker	1000-1500
VCR / DVD Player	200	Food Processor	1000-1500
Laptop / Desktop Computer	500	Hairdryer	1000-2000
13" Television	500	27" Television	1500
Small Kitchen Items	500	3.5 cu. in. Refrigerator	1500
3/8" Drill	1000	Microwave/Oven	1500
19" Television	1000	Vacuum Cleaner	2000
Blender / Coffee Maker	1000	Toaster Oven	2000
Small Microwave	1000	21 cu. ft. Refrigerator	2000

APPLICATIONS

SAIL BOATS

RECREATIONAL VEHICLES

POWER BOATS

CAMPERS

SMART-Y™ ADAPTERS

Charles' patented Smart-Y Adapters enable boaters to reliably double available shore voltage. Designed for long life, the Smart-Y eliminates the potential for shock hazard when one leg is disconnected; both legs must be plugged into the power source before current will flow. Smart-Y products will provide years of trouble-free use in the marine environment. Manufacturer's limited lifetime warranty, made in the USA.

Features

- Plug & cover constructed of UL-recognized thermoplastic vinyl, providing a water-tight waterproof seal
- Nickel-plated phosphor bronze, corrosion-resistant contact blades
- NEMA 4 enclosure protects electrical contacts and relay network
- Molded integral strain relief in the 50 amp plug reduces moisture and minimizes cracking & breakage
- Glass-filled nylon and polycarbonate internal components maintain a high degree of electrical insulation

Product No.	Connectors	Color
93-SMTY50-A	**Female:** 50amp-125/250V twist lock **Male:** (2) 30amp-125V twist lock	Yellow
93-SMTY50W-A	**Female:** 50amp-125/250V twist lock **Male:** (2) 30amp-125V twist lock	White
93-SMTY100-C	**Female:** 100amp-125/250V twist lock **Male:** (2) 50amp-125/250V twist lock	White

C-PHONE SHIP-TO-SHORE COMMUNICATIONS SYSTEM

Full Feature System
The C-Phone system offers the boat owner a wide variety of convenient, useful functions, including an intercom, hailer, security alarm and fog horn.

Modular
The system can be expanded from 4 to 12 stations by adding modules of 4 stations at a time. Thus, the boat owner is not forced to buy more or less than the boat requires.

Easy to Install
Only two conductors (tip and ring) connect the main control to each station. No special wiring, operates on 12, 24 or 32 volts DC.

Economical
The C-Phone is competitively priced. When compared feature-to-feature the C-Phone offers far more than expensive PBX alternatives.

Ability to interface with cellular and satellite options
The C-Phone can easily interface with cellular and satellite options creating a full feature communications system.

Features

- Intercom
- Paging, Security Alarm and Fog Horn when used with the 8 ohm, 30 watt Hailer
- Handset-controlled hailer volume
- Distinctive ring identification, rings differ between land, intercom and cellular calls
- Selective privacy ringing
- Microprocessor controlled with solid-state components
- Designed specifically for marine, onboard use – tested to withstand shock, humidity, vibration, temperature and dust
- 1-year warranty, made in the USA

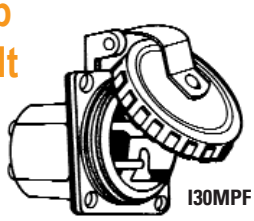
Product No.	Description
93-940400-B	4 Station Master Control Unit
93-EK4000-B	4 Station Expansion Module—add up to 2 modules for a total of 12 stations
97-001685-C	Handset Kit

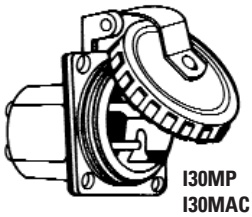
SHORE POWER CABLING SOLUTIONS

MADE IN THE USA

C-Cable® Hull Inlets LIFETIME WARRANTY!

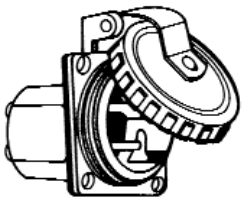
30 Amp 125 Volt


I30MPF


I30MP
I30MAC
I30MP-AC

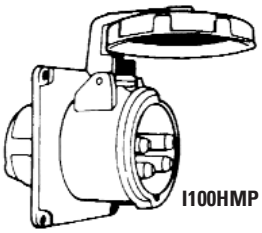
I30	30amp-125V inlet, interior switch replacement
I30MPF	30amp-125V inlet, white polycarbonate w/flip cover
I30MP	30amp-125V inlet, white polycarbonate, threaded cover
I30MP-AC	30amp-125V inlet, white poly., w/chrome ABS threaded cover
I30MAC	30amp-125V inlet, chrome plated ABS, threaded cover

50 Amp 125/250 Volt


I50MBC
I50MP
I50HMBC
I50HMP

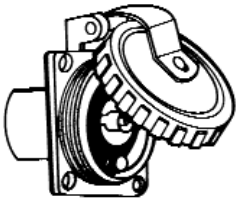
I50MBC	50amp-125V inlet, chrome plated brass
I50MBC-I	50amp-International inlet, chrome plated brass
I50MP	50amp-125V inlet, white polycarbonate
I50HMBC	50amp-125/250V inlet, chrome plated brass
I50HMBC-I	50amp-International 220V inlet, chrome plated brass
I50HMP	50amp-125/250V inlet, white polycarbonate

100 Amp 125/250 Volt


I100HMP

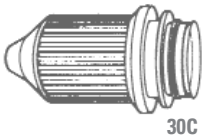
I100HMP	100amp-125/250V single-phase inlet, white polycarbonate

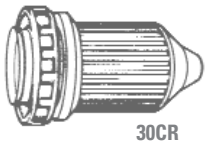
Phone & Cable TV


IPHTVMP
IPHTVVP-AC
IPHTVMAC

IPHTVMPF	Phone/TV inlet, white polycarbonate w/flip cover
IPHTVMP	Phone/TV inlet, white polycarbonate threaded cover
IPHTVMP-AC	Phone/TV inlet, white poly., w/chrome ABS threaded cover
IPHTVMAC	Phone/TV inlet, chrome plated ABS, threaded cover

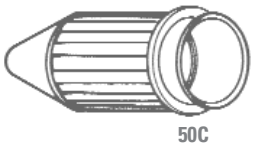
C-Cable® Accessories LIFETIME WARRANTY!

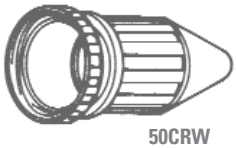

30C


30CR

30F1

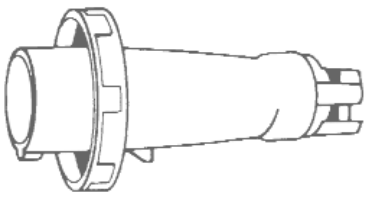
30C	30amp cover, yellow	30F1	30amp-125V female connector
30CW	30amp cover, white	30M1	30amp-125V male plug
30CR	30amp yellow cover, blue ring	30RB	30amp ring, blue

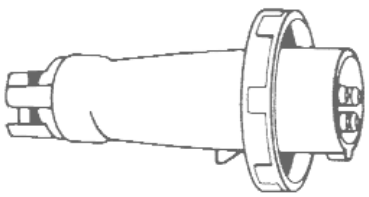

50C


50CRW

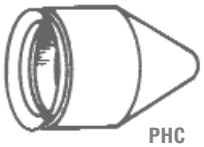
50F1
50HF1

50C	50amp cover, yellow	50F1	50amp-125V female connector
50CR	50amp yellow cover, blue ring	50M1	50amp-125V male plug
50CW	50amp cover, white		
50CRW	50amp white cover, blue ring		


100HF1


100HM1

100HF1	100amp-125/250V, single-phase female connector for use with inlet only
100HM1	100amp-125/250V, single-phase male plug


PHC

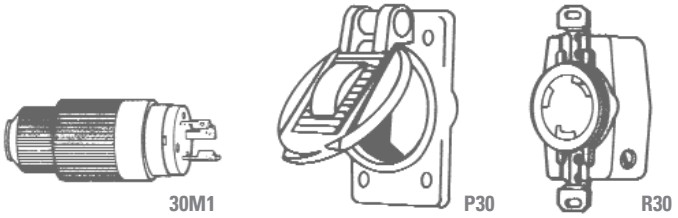
PHF1

PHM1

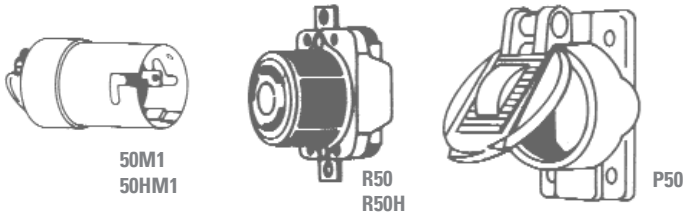
PHC	Phone plug/connector cover boot, yellow
PHF1	Female phone connector
PHM1	Male phone plug

SHORE POWER CABLING SOLUTIONS

SOLID POWER



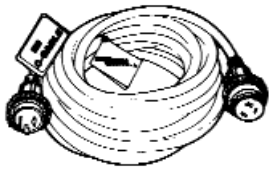
P30	30amp grey cover plate for R30 receptacle
R30	30amp-125V NEMA l5-30R receptacle
COUP30B	30amp watertight connecting coupler assembly, blue
ENDCAPB	Watertight threaded end cap, blue



P50	50amp grey cover plate for R50 and R50H receptacles
R50	50amp-125V NEMA L5-50R receptacle
50HF1	50amp-125/250V female connector
50HM1	50amp-125/250V male plug
R50H	50amp-125/250V NEMA L6-50R receptacle

C-Cable® Cord-Sets

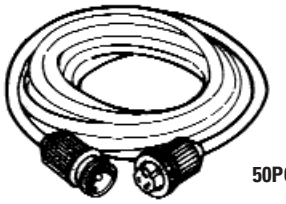
LIFETIME WARRANTY!



30PCM25L
30PCM35L
30PCM50L
30PCM75L

1530PCM35L	15 to 30amp-125V, 35' molded cable (yellow only)
30PCM25L	30amp-125V, 25' molded cable
30PCM35L	30amp-125V, 35' molded cable
30PCM50L	30amp-125V, 50' molded cable
30PCM75L	30amp-125V, 75' molded cable

Standard cord-sets are yellow in color. Cord-sets are available in white.
To order in white, add "W" to end of the part number (i.e. 30PCM25LW).



50PC50

50PC50	50amp-125V, 50' cable cord-set with heavy-duty connectors
50HPC25	50amp-125/250V, 25' cable cord-set with heady-duty connectors
50HPC50	50amp-125/250V, 50' cable cord-set with heady-duty connectors

Standard cord-sets are yellow in color. Cord-sets are available in white.
To order in white, add "W" to end of the part number (i.e. 50HPC25W).

Hand Adapters

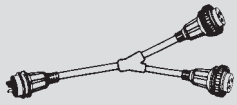
Model #	Connector (Female)	Plug (Male)
A1530	15amp-125V straight blade	30amp-125V twist lock
A3015	30amp-125V twist lock	15amp-125V straight blade

Standard hand adapters are yellow in color. Hand adapters are available in white.
To order in white, add "W" to end of the part number (i.e. A1530W).

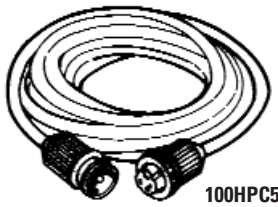
Straight Adapters

A1530S	15amp-125V straight blade	30amp-125V twist lock
A3015S	30amp-125V twist lock	15amp-125V straight blade
A3050S	30amp-125V twist lock	50amp-125V twist lock
A3050HS	30amp-125V twist lock	50amp-125/250V twist lock
A5030S	50amp-125V twist lock	30amp-125V twist lock
A50H30S	50amp-125/250V twist lock	30amp-125V twist lock
A100H50HS/A	100amp-125/250V twist lock	50amp-125/250V twist lock

"Y" Adapters



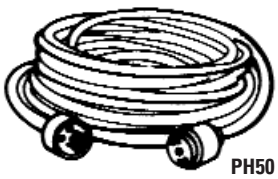
A3030Y30	(2) 30amp-125V twist lock	30amp-125V twist lock
A3030Y30W	(2) 30amp-125V twist lock	30amp-125V twist lock, white
A3030Y50	(2) 30amp-125V twist lock	50amp-125V twist lock
A3030Y50H	(2) 30amp-125V twist lock	50amp-125/250V twist lock
A5050Y50H	(2) 50amp-125V twist lock	50amp-125/250V twist lock



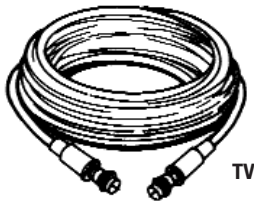
100HPC50W

100HPC50W 100amp=125/250V, 3P 4W single-phase, 50' cable cord-set, white

30, 50 and 100 amp raw cable is available in spools of custom lengths.



PH50



TV50W

PH50	50' Phone cable set, yellow
TV50W	50' TV cable set, white
PH/TV50W	50' Combination Phone/TV cable set, white

ISOLATION TRANSFORMERS

Isolation transformers isolate the boat from shore, protecting onboard electrical systems and electronics from potential shore-side hazards. They also diminish the potential for water shock hazards and eliminate the need for galvanic isolators and polarity alarms. Isolation transformers eliminate galvanic current without electronic components, whereas galvanic isolators use diodes and capacitors to stop current flow. Charles Isolation Transformers are ruggedly constructed, including a full current carrying shield, a thick sheet of copper located between the primary (shore) and secondary (boat) windings of the transformer that must withstand an isolation test of 4,000 volts.

ISO-G2 Isolation Transformers are a compact alternative to galvanic isolators with status monitors that require additional space, increase installation time and cost for the boat builder and do not provide any of the protection from potential shore-side hazards. They offer better onboard protection, easier installation and a better overall value for your boat compared to galvanic isolators. 1-year limited manufacturer's warranty, made in the USA.

Features

- Constructed of lightweight, corrosion-resistant powder coated aluminum
- Built in terminal block and two position installation options for easy wiring.
- Key hole slots allow for easy installation
- Rugged corrosion-resistant components for years of trouble-free use in the marine environment
- Ignition protected
- Meets all ABYC and USCG standards

Installation Kits

97-ISOKIT36-A Installation kit for 3.6 kVA and 3.8 kVA transformers
97-ISOKIT6-A Installation kit for 6 kVA and 7.5 kVA transformers
97-ISOKIT12-A Installation kit for 12 kVA and 15 kVA transformers
97-ISOKIT24-A Installation kit for 24 kVA transformers
Kits include 10ft of appropriate cable and the appropriate terminals, circuit breaker and enclosure for the breaker if needed (for US 240 VAC service), and strain reliefs for the circuit breaker enclosure

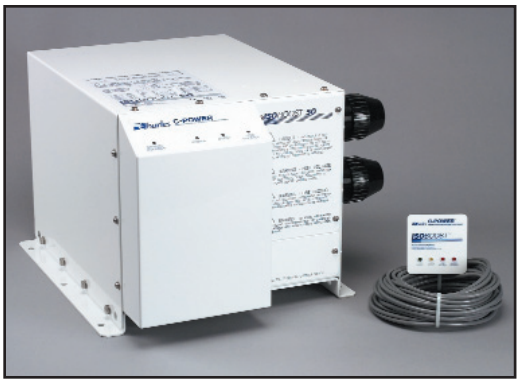
Benefits

- Fully isolates the boat from potential shore-side hazards
- Protects onboard electrical equipment and electronics
- Eliminates the need for galvanic isolators and polarity alarms

SoftStart 93-XFMRSOFT-A
Designed to be installed on a boat's incoming AC shorepower, SoftStart limits the inrush of AC current to a shoreline transformer to eliminate the "nuisance" breaker trip when first powering-up a vessel. May be used with any 50 amp transformer. 120 VAC, 50/60 Hz

Product No.	93-IXFMR3/6T-A	93-IXFMR3/8I-A	93-IXFMR6T-B	93-IXFMR7/5T-A	93-IXFMR12T-A	93-IXFMR12I-A	93-IXFMR15I-A	93-IXFMR24I-A	93-ISOG2/6-A	93-ISOG2/8-A
Kilovolt Amps (kVA)	3.6 kVA	3.8 kVA (International)	6 kVA	7.5 kVA (International)	12 kVA	12 kVA (International)	15 kVA (International)	24 kVA (International)	3.6 kVA	3.8 kVA
Input Current	30 amps	32/16 amps	50 amps	32/16 amps	50 amps	50 amps	64 amps	100 amps	30 amps	30/16 amps
Input Voltage	120 VAC	120/240 VAC	120 VAC	240 VAC	240 VAC	120/240 VAC	240 VAC	200/208/220/ 230/240 VAC	120 VAC	120/240 VAC
Frequency	60 Hz	50/60 Hz	60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	60 Hz	50/60 Hz
Output Current	30 amps	32 amps	50 amps	32 amps	50 amps	50 amps	64 amps	100 amps	30 amps	30/16 amps
Output Voltage	120 VAC	110/220 VAC	120 VAC	110/220 VAC	120/240 VAC	120/240 VAC, 104/208 VAC	120/240 VAC	120/240 VAC, 104/208 VAC	120 VAC	120/240 VAC
Dimensions	10.5"x10.5"x8"	10.5"x10.5"x8"	11.75"x10"x11"	11.75"x10"x11"	16"x15"x12"	16"x15"x12"	16"x15"x12"	18.5"x20.5"x17"	9.65"x10.5"x9"	9.65"x10.5"x9""
Weight	60 lbs.	70 lbs.	200 lbs.	157 lbs.	235 lbs.	235 lbs.	235 lbs.	550 lbs.	76 lbs.	79 lbs.
Protection Features	Fully encapsulated components and transformer winding, all units feature separate wiring compartments - one for input, another for output. Enclosures meet NEMA 3R requirements and are corrosion resistant.									
Ignition Protected	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL, cUL Listed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Strain Relief Product No.	97-001127-A	97-001127-A	97-001120-A	97-001120-A	97-001120-A	97-001120-A	97-001120-A	97-001121-A	Included	Included
90 Degree Strain Relief	Not Available	Not Available	97-001755	97-001755	97-001755	97-001755-A	97-001755-A	97-001741-0	—	—
Warranty	1-Year	1-Year	1-Year	1-Year	1 Year	1-Year	1 Year	1-Year	1-Year	1-Year
Notes	Marine UL/cUL requires the use of strain reliefs with these units; 90 degree and straight strain reliefs are available.									

ISO-BOOSTS® WITH SOFTSTART™



Charles Iso-Boost units combine all of the functions/features of an isolation transformer with a voltage sensing and switching circuit. The circuit provides the ability to automatically increase the line voltage on your boat. As well as completely isolating input power (shore) from output power (boat) protecting onboard systems and equipment, the Iso-Boost increases the boat's voltage when it falls below a preset threshold due to low shoreline voltage. The Iso-Boost offers the reliability and assurance that adequate voltage is supplied to all of the onboard AC equipment. Units include built-in SoftStart technology. 1-year warranty, made in the USA.

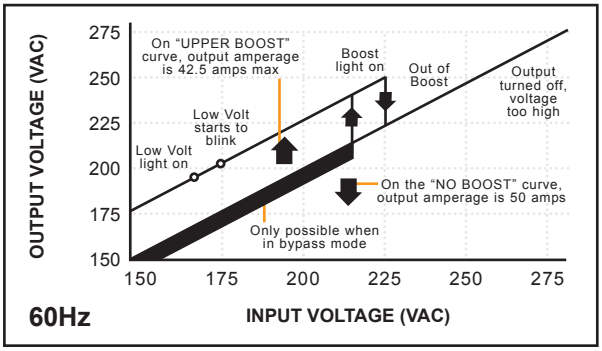
Reasons to boost voltage

Many marinas fluctuate dockside voltages. In fact, many marinas are installing 120/208 volt power rather than 120/240 volts. Though the marina may offer adequate power, if your boat is at the end of a long dock run, or if other boats along that dock run are drawing large amounts of current (i.e. running a lot of equipment) your boat may not be receiving the voltage it needs. Onboard equipment with motors such as air conditioners, require a full 240 volts to properly operate. If your boat is not receiving enough voltage, items that are sensitive to low voltage may not operate properly.

Effect of using an Iso-Boost

When the Iso-Boost is in the boost mode, you will sacrifice amps to increase voltage. The voltage chart illustrates volts/amps of Iso-Boost.

ISO-BOOST VOLTAGE CHART



Installation Kits

97-ISOKIT12-A
Install Kit for 93-ISOBOOST50-B
97-ISOKIT24-A
Install Kit for 93-ISOBOOST100-B

Kits include:

- 10ft.of appropriate cable and the appropriate terminals
- A circuit breaker and enclosure for the breaker if needed (for US 240VAC service)
- Appropriate sized Strain Reliefs for the circuit breaker enclosure

Product No.	Kilovolt Amps (kVA)	Input Current	Input Voltage	Frequency	Output Current	Output Voltage	Dimensions	Weight
93-ISOBOOST50-B	12 kVA	50 amps	167-255 VAC	50/60 Hz	42.5/50 amps	192-255 VAC	18"x15"x12"	235 lbs.
93-ISOBOOST100-B	24 kVA	100 amps	167-255 VAC	50/60 Hz	85/100 amps	192-255 VAC	21"x21"x17"	575 lbs.

Remote Monitoring Panel with diagnostic LEDs:
93-ISOBREMOTE-A

SMARTBOOST™ UNIVERSAL AC VOLTAGE BOOSTER

The SmartBoost is a universal AC voltage booster designed to increase incoming AC shore power voltage. When dockside power drops below 208 VAC, SmartBoost provides a 13% AC voltage boost to any existing 50 Amp transformer. Designed as a separate boost control unit, SmartBoost may be connected to any manufacturer's 12 kVA or 15 kVA (50 Amp) isolation transformer.

Easy to install and use, SmartBoost offers fully automatic operation with manual 1:1 override and features Low Voltage, Boost and Power LED indicators. Terminal blocks allow for easy customer connections. An optional remote indicator panel (Part #93-SMTBREMOTE-A) permits monitoring of operational status from any convenient location. 1-year limited manufacturer's warranty, made in the USA.

Features

- Rugged high-quality construction
- Fully automatic operation with manual 1:1 override
- Low voltage, boost and power LED indicators
- Optional remote LED indicator

Product No.	Max. Input Current	Input Voltage	Frequency	Max. Output Current	Output Voltage	Dimensions	Weight
93-SMTBST50-B	50 amps	177-240 VAC	50/60 Hz	50 amps	200-250 VAC	9"x12.75"x12.75"	50 lbs.

Remote Monitoring Panel with diagnostic LEDs: 93-SMTBREMOTE-A

SHOREBOOST™ PORTABLE AC POWER BOOSTER

The Shoreboost monitors shore power and adapts it to maintain a safe operating voltage for your vessel's AC power system. Used in tandem with a 50 Amp Isolation Transformer, the Shoreboost monitors shore power and when it detects a drop to or below 208VAC, it provides a 13% voltage boost to the AC system. If shore power increases to 223VAC, the unit will provide a 1:1 voltage ratio input to output. When shore power falls to 166VAC, the unit will shut down until the input voltage level reaches 180VAC or higher, then normal operation will resume. The green LED indicator on the output side indicates proper operation. 1-year limited manufacturer's warranty, made in the USA.

Features

- Unique "portable" dockside boosting module that increases incoming dockside power by 13%
- Designed for marinas where fluctuating power is an issue, and for those wired only for 208V
- 6' Male 50 amp, 125/250 volt input connector, 4' Female 50 amp, 125/250 volt output connector

Specifications

Input Voltage:	208VAC
Operating Frequency:	60Hz
Maximum Input Current:	50 Amps
Output Voltage:	120/240VAC
Maximum Output Current:	44 Amps
Operating Temperature:	0ºC to 55ºC

Product No.	Description	Dimensions	Weight
93-SHRBST50-A	50 Amp Shoreboost AC Power Booster	15.5"x13.5"x8.75"	64 lbs.

DOCKBOOST™ AC VOLTAGE BOOSTER

The Dockboost is a dockside AC Voltage Booster that allows marina owners with 208VAC power pedestals to also offer 240VAC dockside power. An integrated polarization transformer provides a 15% AC voltage boost to any 208VAC dock service for clean, reliable 240VAC service.

A rugged, high-quality housing constructed of stainless steel ensures years of dependable service in harsh marine fresh and salt-water environments. The Dockboost comes equipped with output circuit breaker protection to prevent overloading. 1-year limited manufacturer's warranty, made in the USA.

Features

- AC voltage booster
- Provides a 15% voltage boost to any 208VAC dock service for a total of 240VAC
- Utilizes output circuit breaker protection to prevent overloading
- 6' Male 50 amp, 125/250 volt input connector, 2' Female 50 amp, 125/250 volt output connector

Specifications

Input Voltage:	208VAC
Operating Frequency:	60Hz
Maximum Input Current:	50 Amps
Output Voltage:	120/240VAC
Maximum Output Current:	44 Amps
Operating Temperature:	0ºC to 55ºC

Product No.	Description	Dimensions	Weight
93-DBOOST50-A	50 AMP Dockboost AC Voltage Booster	16"x13"x10.5"	250 lbs.

A/B SELECTOR SWITCHES

Function
A/B Selectors automatically sense the location of the power source: port, starboard, fore or aft. The unit selects the AC connection and locks out a second power source. Units both electrically and mechanically lock out a secondary source. 9R units feature a fiberglass housing that does not need to be grounded.

Benefits
- Eliminates live unused inlets, eliminates possibility of crossed connections
- Interlock controlled contacts ensure proper connections
- Eliminates the need for manual switch gear such as rotary switches and slide bar lock outs; all switching is done automatically
- Eliminates inconvenient trips to the engine room to change power sources
- Constructed of corrosion-resistant materials for years of trouble-free use

1-year limited manufacturer's warranty, made in the USA.

Product No.	9R-ABSEL30/50-D	9R-ABSEL50I-D	93-ABSEL100I-B
Input/Output Current	30/50 amps	50 amps	100 amps
Input/Output Volts	120 VAC	220 VAC	220 VAC
Enclosure Type	Fiberglass	Fiberglass	Aluminum
Dimensions	13"x10"x7"	13"x10"x7"	16"x15"x12"
Weight	25 lbs.	25 lbs.	90 lbs.
Strain Relief Kit #	CALL	CALL	97-001715-A
Warranty	1-year warranty, made in the USA		

AC MASTER CONTROL

Function
The AC Master Control maximizes AC input capabilities. This product automatically transfers loads from multiple inlets and generators (maximum of 4 inputs) on 50 and 100 amp, 240 VAC electrical systems.

How does it work?
Within five seconds of turning on shore power with the generator running, the AC Master Control will take the generator off line and after a three second delay, automatically engage shore power.

Benefits
- Simplifies the engine room eliminating slide bar controls and additional wiring. Engine rooms with slide bar controls need more wire harnessing, bigger panels and require the boat owner to make decisions about power sources
- Eliminates inconvenient trips to the engine room to decide which switches to move in order to ready the boat for shore power vs. onboard power
- All switching is done automatically, eliminating the possibility of crossed connections

1-year limited manufacturer's warranty, made in the USA.

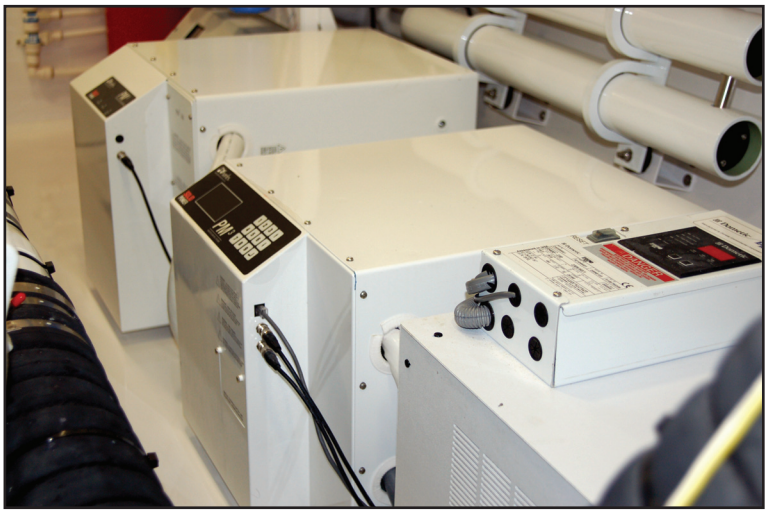
Product No.	93-ACMC50I-B	93-ACMC100I-B
Input/Output Current	50 amps	100 amps
Input/Output Volts	180-255 VAC	180-255 VAC
Frequency	50/60 Hz	50/60 Hz
Dimensions	16"x15"x12"	18.5"x20.5"x17"
Weight	70 lbs.	100 lbs.
Stress Relief Kit #	97-001743-A	97-001715-A
Warranty	1-year warranty, made in the USA	

PM3™ MODULAR AC POWER MANAGEMENT SYSTEM

PM³ provides boat builders with greater freedom in managing onboard loads up to a maximum of 100 Amps (while connecting to two 240 volt 50 Amp shore power pedestals). Yacht owners gain the ability to operate the maximum rated amount of AC electrical equipment without the worry of exceeding load capacity. Provided shore-power is available, the PM³ will supply a minimum of 50 Amps, maximum of 100 Amps to the vessel's main distribution point. PM³'s unique 3-piece modular design allows the boat builder to disperse the size and weight of the product as required onboard. A PM³-100 model is available with double the amperage capacity (200 Amps maximum output). 1-year limited manufacturer's warranty, made in the USA.

Features

- Two isolation transformers with voltage boost
- Control box with micro-processor controlled operation, fluorescent display and key pad
- Diagnostic capabilities & large, removable access cover to allow for in-field service
- 40-character VFD remote display
- Control Box features:
  - Microprocessor-controlled with customized software, VFD display and keyboard
  - Automatic Boost, Phase Correction & Mode Select (Normal, Separate, Source "A", Source "B")
  - Automatic mode-switching capability when abnormal conditions are present
  - Manual Override
  - Service-friendly diagnostics display any abnormalities or component issues
  - Modem port for remote diagnostics



Product No.	Kilovolt Amps	Input Current	Input Voltage	Frequency	Output Current	Output Voltage	Dimensions	Weight
9C-PM3-A	Input: 12KVA (x2) Output: 24KVA	50 amps (x2)	185-265 VAC	50/60 Hz	100 amps (50 amps with single input)	240 VAC	18"x15"x12" - Control Unit 20"x15"x"12" - Transformer (2 required)	552 lbs. combined
9C-PM3-100-A	Input: 24KVA (x2) Output: 48KVA	100 amps (x2)	185-265 VAC	50/60 Hz	200 amps (100 amps with single input)	240 VAC	23"x21"x17" - Control Unit 25"x21"x"19" - Transformer (2 required)	1250 lbs. combined

Charles Marine Group is a proud member of the following marine industry associations:

NMMA NMEA ABYC® Setting Standards for Safer Boating

BOAT STANDS

Charles boat stands are constructed from high-grade welded steel with a dark green powder coated finish to minimize corrosion and rusting. They are built in the USA to demanding specifications that ensure safety and ease of use. A wing nut design on a solid steel threaded rod allows tops to be raised or lowered quickly and easily. Side stands are stackable, and storage racks are available for both keel and side stands.

Recommended Placements
All boats are different: please consult a storage professional for individual requirements.

Keel Stands (KS)
One keel stand per every 10,000 lbs. of boat weight. Stands should be spaced evenly along the keel. A minimum of two keel stands is required.

Side Stands (SS-P) (for power boats)

Boat Length	# of Stands
Less than 30′	4
30′ - 40′	6-8
40′ - 55′	8-10
55′ - 70′	10-12
70′ and over	12 or more

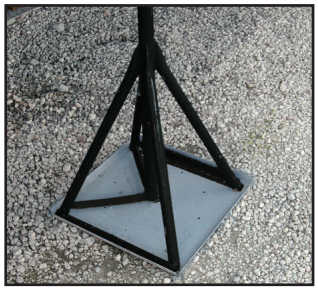
Side Stands (SS-S) (for sail boats)

Boat Length	# of Stands
Less than 30′	6
30′ - 40′	6-8
40′ - 55′	8-10
55′ - 70′	10-12
70′ and over	12 or more

SIDE STANDS - SAIL (SS-S)

Part #	Description
RFKS-1624	Keel Stand, 16” - 24”
RFKS-2430	Keel Stand, 24” - 30”
RFKS-3038	Keel Stand, 30” - 38”
RFSS-P3350	Side Stand - Power Boats, 33” - 50”
RFSS-P4158	Side Stand - Power Boats, 41” - 58”
RFSS-P4764	Side Stand - Power Boats, 47” - 64”
RFSS-S3552	Side Stand - Sail Boats, 35” - 52”
RFSS-S4865	Side Stand - Sail Boats, 48” - 65”
RFSS-S6479	Side Stand - Sail Boats, 64” - 79”

MADE IN THE USA



1/8” aluminum stand pans provide secure stand placement on uneven surfaces and provide uniform weight dispersion. ***For use with KS and SS-P model stands only.***

Part #	Description
21-108129-0	Aluminum stand pan, 21”x21”

KEEL STANDS (KS)

SIDE STANDS - POWER (SS-P)